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PATENT ABSTRACTS OF JAPAN

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(54) METHOD OF FORMING SEMICONDUCTOR FILM

(57) Abstract:

PURPOSE: To enable polycrystalline Si film growth and epitaxial growth of large mobility at a low temperature, by forming an Si film on a substrate by using thermal decomposition or optical decomposition of specified silane material.

CONSTITUTION: An Si film is formed on a substrate by thermally or optically decomposing raw material of

silane ($\text{Si}_n\text{H}_{2n+2}$), $n \geq 3$, like trisilane (Si_3H_8) and tetrasilane (Si_4H_{10}). By CVD method, a polycrystalline Si film whose grain diameter is about $3\text{ }\mu\text{m}$ can be formed when the temperature of a Pyrex glass substrate is 400°C . A TFT using an Si film has large electric charge mobility and high speed operation is realized. The similar polycrystal can be obtained by irradiating the surface of the substrate at 100°C with ultraviolet rays. In order to epitaxially grow a single crystal Si film on a single crystal Si substrate by using Si_3H_8 or Si_4H_{10} as raw material, the substrate temperature is set at 100°C , and ultraviolet rays are projected or plasma is utilized.

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